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ABSTRACT

A study examined the association of reading instruction with the amount and breadth of students' reading activities, taking account of social, cognitive, and home factors in the educative process. A secondary analysis of a large national data base for students aged 9, 13, and 17 was conducted. Using answers from student questionnaires, conceptual criteria and factor analysis identified five constructs (such as study strategies) for 9-year-olds, eight constructs for 13-year-olds, and nine constructs for 17-year-olds. Path analyses were performed to describe the relationships of these constructs to amount of students' reading activity. The resulting path models for the three age groups had goodness of fit indices of 0.98 or higher. For 9-year-olds, amount of reading was associated with levels of social interaction surrounding reading, cognitive strategies for reading, and teacher-directed instruction. The path model of reading for 13- and 17-year-olds was generally similar to that for 9-year-olds. For 17-year-olds, the construct of reading activity subdivided into fiction, nonfiction, and news, and student-centered instruction entered as a predictive factor. Findings suggest that an instructional framework that supports the social and cognitive needs of students from a wide range of home backgrounds accounts for the amount and breadth of students' reading. (Five tables of data and four figures representing path models are included.) Contains 40 references. (RS)

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Influences of Instruction on Amount of Reading

An Empirical Exploration of Social, Cognitive, and Instructional Indicators

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READING RESEARCH REPORT NO. 3
Summer 1993

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About the National Reading Research Center

The National Reading Research Center (NRRC) is funded by the Office of Educational Research and Improvement of the U.S. Department of Education to conduct research on reading and reading instruction. The NRRC is operated by a consortium of the University of Georgia and the University of Maryland College Park in collaboration with researchers at several institutions nationwide.

The NRRC's mission is to discover and document those conditions in homes, schools, and communities that encourage children to become skilled, enthusiastic, lifelong readers. NRRC researchers are committed to advancing the development of instructional programs sensitive to the cognitive, sociocultural, and motivational factors that affect children's success in reading. NRRC researchers from a variety of disciplines conduct studies with teachers and students from widely diverse cultural and socioeconomic backgrounds in prekindergarten through grade 12 classrooms. Research projects deal with the influence of family and family-school interactions on the development of literacy; the interaction of sociocultural factors and motivation to read; the impact of literature-based reading programs on reading achievement; the effects of reading strategies instruction on comprehension and critical thinking in literature, science, and history; the influence of innovative group participation structures on motivation and learning; the potential of computer technology to enhance literacy; and the development of methods and standards for alternative literacy assessments.

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Abstract. We examined the association of reading instruction with the amount and breadth of students' reading activities, taking account of social, cognitive, and home factors in the educative process. We conducted secondary analyses of a large national data base for students aged 9, 13, and 17. Using answers from student questionnaires, we applied conceptual criteria and factor analysis to identify 5 constructs (such as study strategies) for 9-year-olds, 8 constructs for 13-year-olds, and 9 constructs for 17-year-olds. We performed path analyses to describe the relationships of these constructs to amount of students' reading activity. The resulting path models for the three age groups had goodness of fit indices of .98 or higher. For 9-year-olds, amount of reading was associated with levels of social interaction surrounding reading, cognitive strategies for reading, and teacher-directed instruction. The path model of reading for 13- and 17-year-olds was generally similar to that for 9-year-olds. For 17-year-olds, the construct of reading activity subdivided into fiction, nonfiction, and news, and student-centered instruction entered as a predictive factor. In accounting for the amount and breadth of students' reading, we emphasized an instructional framework that supports the social and cognitive needs of students from a wide range of home backgrounds.

Understanding students' amount and breadth of reading is important because reading is central to a variety of cultural practices. We concur with sociolinguists who suggest that reading is embedded in a wide range of activities that are woven into the fabric of society (Gee, 1992; Heap, 1991). Historians and anthropologists have documented that reading enables people to participate in the debate of politics, the discourse of science, and the negotiations required in business (Graff, 1987; Goody, 1968). Political scientists report that individuals who are predisposed to invest time in reading are active in specialized communities such as civic and professional associations. Decision makers in corporate and political organizations read more frequently and more intensively than citizens who are less involved in decision making (Guthrie &

Greaney, 1991; Reder & Green, 1983). Among a national sample of young adults in the USA, amount and breadth of reading contributed more to participation in society and level of entry to the workplace than previous reading achievement (Guthrie, Schafer, & Hutchinson, 1991). Because a diverse, literate culture demands diverse reading, we think it is desirable to understand how students develop the disposition to read widely and frequently.

A second reason for studying the development of active reading is that there is a critical relationship between amount of reading and reading achievement. Morrow and Weinstein (1986) have shown that opportunities for independent reading and writing in the primary grades increased both the amount of students' reading and their level of reading achievement. Several authors (Anderson, Wilson, & Fielding, 1988; Cunningham & Stanovich, 1991) have reported that in the intermediate grades, the amount of students' exposure to print was associated with their vocabulary levels. In addition, whole language teachers maintain that active engagement of children in reading and writing is intrinsically valuable in fostering literacy growth (Allen, Michalove, Shockley, & West, 1991).

Unfortunately, there is relatively little research on the educational factors that influence the amount of reading students do. Studies from Great Britain have reported that the accessibility of books in classrooms and school libraries (Greaney & Hegarty, 1987) and encouragement from teachers to use those books (Ingham, 1981) influence the amount of students' voluntary reading. In the U.S., Hiebert and Fisher (1990) have reported that the use of literature in reading instruction influenced the amount of reading students did. However, previous studies have not examined quantitatively the combined influences of instructional, social, and cognitive variables on the amount and breadth of students' reading. Nor have prior researchers attempted to examine whether the relationships of these factors vary for students who come from homes with differing values related to literacy.

In discussing how instruction influences students' amount and breadth of reading, we first address the social context of reading. Not only do social factors influence the materials, purposes, and circumstances of reading in general (Gee, 1992), but social context influences the instructional processes within the classroom. Adopting a sociolinguistic perspective, Green & Weade (1987) suggest that language arts lessons can be seen to be composed of a social structure (who can speak and when), an academic structure (content themes), and an activity structure (what is going on). Student participation in individual or group work and student performance of reading tasks are interdependent, orchestrated by the teacher. Extending this perspective, Harste and Woodward (1989) contend that reading is developed by exploring and communicating through drawing, drama, and writing.

Reading and writing in a social context can foster a variety of learnings that develop through text and about text. Participation in socially situated literacy events can increase the reader's knowledge of reading processes, written language conventions (Snow & Ninio, 1986), and literary interpretative possibilities (Rogers, 1991). Participation in peer-peer interactions may increase students' awareness

of multiple perspectives on a literary theme (Eeds & Wells, 1989). Social exchange during the learning of literature may lead to the development of critical judgments about literary works (Golden, 1986). Despite the contributions of these investigations to our understanding of the processes of literary interpretation, these studies have not directly addressed the issue of whether social context mediates the amount and breadth of students' reading activity.

Several experimental and observational studies have shown that social patterns in the classroom shape students' amount and breadth of reading. For example, when teachers encouraged students to debate the ideas and themes in literature, the students spent more time reading the material related to the lessons than when teachers asked students to answer a few specific questions over the texts (Morrow & Weinstein, 1986). When teachers encouraged students to debate and discuss the concepts in science books, the students showed more conceptual change as a result of reading than when students were expected to learn and remember texts more literally (Alvermann & Hynd, 1989). A teacher's invitation to participate socially in discussion appears to increase the amount of reading and thinking related to the texts within the instruction. What we do not know is whether the social interaction patterns of students influence their amount and breadth of reading of new books and materials inside and outside of the classroom. This issue is certainly debatable. Those who argued that reading is primarily a cognitive process (e.g., Anderson & Pearson, 1984) did not suggest that social context would affect any aspect of reading; whereas those who argue that reading is socially mediated (Bloome & Green, 1992; Golden, 1986) would expect a positive influence of social factors on amount and breadth of reading.

Deeply connected with social context, the learning and use of cognitive strategies influence students' amount and breadth of reading. Our view of the role of cognitive strategies is informed by the theory of self-determination, which has been developed by Deci and his colleagues (Deci, Vallerand, Pelletier, & Ryan, 1991). They suggest that students will engage relatively often in activities in which they feel cognitively competent. For example, students who feel (and who are) intellectually capable of reading books with ease will, indeed, be active readers. These students will become self-determining, choosing to read relatively often on their own initiative. Students who are aware of their cognitive strategies usually enjoy an enhanced sense of self-efficacy, which probably extends the amount and breadth of their reading (Borkowski, Carr, Rellinger, & Pressley, 1989).

We think that cognitive strategies for learning from text, such as drawing inferences, forming visual images, using background knowledge, self-monitoring, and summarizing (Dole, Duffy, Roehler, & Pearson, 1991) enable students to feel empowered, and we suggest that this sense of self-confidence leads students to read more frequently and widely. An opposing argument could be made, however. Some authors suggest that strategy instruction is unnecessary at best and distracts students from the aesthetic experience that forms the basis of pleasurable reading (Beach & Hynds, 1991). If so, strategy instruction would decrease, rather than increase, students' amount and breadth of reading. One of the

purposes of this study was to investigate this issue.

In sum, we suggest that instruction is likely to influence students' amount and breadth of reading through a combination of social and cognitive factors. A teacher who forms a social milieu for sharing stories among children creates the opportunity for students to acquire interpersonal support for reading. Likewise, a teacher who provides instruction in cognitive strategies, such as summarizing during reading, is equipping the student to be successful as she makes a variety of reading choices. Although these social and cognitive factors have been studied separately, they have not been sufficiently examined in terms of how they work together. Further, the influences of these factors have not been studied on students from different backgrounds and age groups. We attempted to study the complex interplay of social, cognitive, instructional, and home factors as they influenced the amount and breadth of reading for three age groups of students from a wide range of home backgrounds.

The present study was guided conceptually by the following questions:

1. Are there direct associations between amount of students' social interaction about reading and the amount of their reading activity?

2. Are there direct associations between students' use of cognitive strategies and the amount of their reading activity?

3. How is reading instruction associated with students' social interactions, cognitive strategies, and amount of reading activity?

4. Are the patterns of association among social interaction, cognitive strategies, instruction, home literacy, and reading activity similar for 9-, 13-, and 17-year-olds?

5. Are the associations between instruction, social interaction, cognitive strategies, home literacy, and reading activity the same for different types of reading, such as fiction and nonfiction?

METHOD

Several approaches to collecting data allow examination of the proposition that amount of reading activity is mediated by social, cognitive, and instructional aspects of the education process. In the present study, we used a quantitative approach, taking advantage of the rich data on student characteristics collected in nationally representative surveys. Through matrix sampling, the large scale survey can collect an abundance of information on broad samples of students at many ages.

The sociolinguistic perspective on reading and the cognitive strategies literature both contain a wealth of ideas, constructs, and variables of importance. In the present study, we did not attempt to capture all of the complexity in these perspectives on reading. Rather, we attempted to identify indicators of

social, cognitive, and instructional factors. Each indicator is a symbol that stands for a large collection of aspects of the domain. The questions used to form the indicators are samples of other questions that might have been asked. The specific questions are correlated to each other, and probably to other unasked questions that form the indicator. The indicators are examined for their relationship to other indicators.

We used the 1986 National Assessment of Educational Progress because it contained 74 questions on instruction, reading activity, social factors, and cognitive variables that we found to be useful (see Table 1). Many of the same questions were given to 9-, 13- and 17-year-olds, permitting cross-age comparisons as well as extensive modeling of students' amount and breadth of reading at these age levels.

Sample Selection and Data Collection

This study is a reanalysis of the 1986 National Assessment of Educational Progress (NAEP) study in reading. This section briefly describes the features of the 1986 NAEP sample design and data collection. Detailed discussion of the design and data collection for this assessment can be found in the NAEP *User Guide* (Rogers, Kline, et al., 1988). The sample for the 1986 NAEP assessment was selected using a complex 4-stage design. In the first stage, the United States was divided into 94 geographic primary sampling units (PSU). In the second stage, schools within each PSU were selected without replacement with probabilities proportional to the numbers of eligible students. For the sake of enhancing reliability of estimation, probabilities of selection for high-minority schools were twice those for other schools to enlarge the sample for African American and Latino students. The third stage involved taking a sample of students from schools. In the fourth stage of sampling, a consolidated list of all eligible students was compiled for each selected school, and systematic selection of students was made to develop the target sample. To be conservative when performing regression analyses, the number of subjects of each age group was determined as a quotient of the unweighted total number of students in the spiralled sample divided by the number of blocks of items. As a result, N = 926 (dividing 21,287 by 23) for age 9, N = 922 (dividing 27,668 by 30) for age 13, and N = 947 (dividing 39,753 by 42) for age 17.

Instrument Design

In the NAEP administration of the reading assessment, two sets of items, attitudinal items and cognitive items, were developed to be administered to each student. Items were assigned to students by means of a balanced incomplete block design. Items within a subject area were assembled into 16-minute blocks, each block comprising 2 minutes of attitude items and 14 minutes of cognitive items. Each student was administered a booklet containing three subject area blocks and a block of common background items, for a total testing time of approximately 54 minutes. The order of booklets for each grade/age was spiralled in such a way that no two students in any one assessment session received the same booklet. Reading achievement, as a dependent variable in our study, was comprised of 69 items for age 9, and 74 items in common for ages 13 and 17.

Table 1. Questionnaire Items Used in Constructs for Three Age Groups with Loadings

Item Label	Construct Name (and Initials)	Age/Loadings		
	HOME LITERACY (HL)			
		9	13*	17
HL1	Does your family get a newspaper regularly?	.11	.16	.14
HL2	Does your family get magazines regularly?	.12	.18	.17
HL3	Are there more than 25 books in your family?	.13	.10	.08
HL4	Is there an encyclopedia in your family?	.27	.20	.15
HL5	Is there a dictionary in your family?	.10	.07	.04
HL6	Does your family own a computer with a keyboard and screen?	.10	.13	.10
	SOCIAL INTERACTION (SI)			
		9	13**	17**
SI1	During the last month how often did you talk with your friends about something you read?	.21	.34	.35
SI2	During the last month how often did you talk with someone at home about something you had read?	.20	.38	.33
SI3	How often do you have papers printed in school?	.07	.24	.15
SI4	How often have you shown friends your writings?	.17	.27	.31
SI5	How often do people in your family read papers you have written? How often does someone at home ask about school work?	.04	.31	.31
SI6	Does your family have rules about amount of TV watched?	.10	.22	.20
SI7	How often do you tell a friend about a good book?	.08	.17	.12
SI8		.14	n/a	n/a
	TEACHER-DIRECTED INSTRUCTION (TDI)			
		9**	13	17
TI1	How often does your teacher point out hard and new words when you get something new to read?	.18	.23	.24
TI2	How often does your teacher tell a little about what you will be reading when you get something new to read?	.13	.15	.14
TI3	How often does your teacher tell how to find the main idea of a paragraph when you read?	.17	.11	.17
TI4	How often does your teacher tell you how to read faster when you read?	.13	.10	.08
TI5	How often does your teacher give you a list of questions to answer when you read?	.18	.11	.13
	STUDENT-CENTERED INSTRUCTION (SCI)			
		9*	13	17
SC1	How often does your teacher ask you to give your ideas or opinions about what you are reading?	n/a	.22	.25
SC2	How often does you teacher ask you which part of a story or article supports your ideas or opinions?	n/a	.26	.26
SC3	How often does your teacher ask you questions about how one idea or story is like another?	n/a	.18	.21
SC4	How often does your teacher point out how authors choose words for special effects?	n/a	.16	.20
SC5	How often does your teacher have small groups of students read and discuss the same novel or library book?	n/a	.12	.14

Table 1. Questionnaire Items Used in Constructs for Three Age Groups with Loadings

Item Label	Construct Name (and Initials)	Age/Loadings		
	STUDY STRATEGIES (ST)			
		9*	13	17
ST1	How often do you take notes on what you read when you study for a test?	.22	.23	.24
ST2	How often do you make outlines when you study for a test?	.23	.19	.20
ST3	How often do you read the materials over a few times when you study for a test?	.13	.18	.16
ST4	How often do you answer the questions in the textbook?	.08	.15	.16
ST5	How often do you work with somebody else and ask each other questions when you study for a test?	.13	.15	.15
ST6	How often do you answer the questions that you make up?	.13	.20	.16
ST7	How much time do you usually spend on homework when you study for a test?	.06	.09	.14
ST8	How often do you work in a workbook?	-.01	.06	.07
	LIBRARY READING (LR)			
		9	13	17
LR1	How often do you go to the library to read on your own just for fun?	n/a	.20	.17
LR2	How often do you go to the library to have a quiet place to read?	n/a	.23	.19
LR3	How often do you go to the library to take out books?	n/a	.18	.13
LR4	How often do you go to the library to find books to help you with your hobbies?	n/a	.16	.09
LR5	How often do you go to the library to look up facts for school?	n/a	.14	.09
	Age 9 — GENERAL READING ACTIVITIES - (GRA) **Age 13 — GENERAL READING ACTIVITIES - (GRA)** **Age 17 — FICTION READING (FR) and NON-FICTION READING (NF)**			
	GENERAL - 9			
		9	13	17
GR1	How often do you read comic books?	.16	n/a	n/a
GR2	How often do you read a book after you see a TV show or movie that was based on the book?	.15	n/a	n/a
GR3	How often do you read more than one book by an author you like?	.16	n/a	n/a
GR4	How often do you read for fun on your own time?	.18	n/a	n/a
	GENERAL - 9, GENERAL - 13, FICTION - 17			
		9	13	17
FR1	How often do you read on your own in school?	n/a	n/a	.17
FR2	How often do you read part of a story or a novel?	n/a	n/a	.19
FR3	How often do you read a poem?	n/a	n/a	.12
FR4	How often do you read a play?	n/a	n/a	.06
GR5 (FR5)	How often do you read the words of a song?	n/a	.13	.17
GR6 (FR6)	How often do you read a book about other times or other places?	.15	.11	.17

Table 1. Questionnaire Items Used in Constructs for Three Age Groups with Loadings

Item Label	Construct Name (and Initials)	Age/Loadings		
	GENERAL - 9, GENERAL - 13, NONFICTION - 17			
		9	13	17
GR7 (NF1)	How often do you read a sports book?	.17	.12	.12
GR8 (NF2)	How often do you read a biography?	.15	n/a	.04
GR9 (NF3)	How often do you read a science book?	n/a	.10	.09
GR10 (NF4)	How often do you read a magazine?	.15	.24	.23
GR11 (NF5)	How often do you read a news magazine?	.12	.13	.12
GR12 (NF6)	How often do the people you live with read magazines?	n/a	.24	.27
GR13 (NF7)	How often do people you live with read recipes or instructions on how to do something?	n/a	.17	.21
GR14 (NF8)	How often do people you live with read books?	n/a	.16	.21
	NEWS READING (NW)			
		9*	13	17
NW1	How often do you read a newspaper?	n/a	.27	.39
NW2	How often do you read parts of the newspaper besides the comics and sports section?	n/a	.33	.32
NW3	How often do you read a news magazine?	n/a	.13	.15
NW4	How often do you watch news on television?	n/a	.13	.14
NW5	How often do the people you live with read the newspaper?	n/a	.12	.16

* The unweighted covariance matrix was used.

** Since both weighted and unweighted covariance matrices were not positive definite using LISREL, the weighted covariance matrix was thus used as input for SAS to conduct a principal factor analysis.

However, each individual student did not take more than 14 cognitive reading items. Reading scores have been rescaled using a 3-parameter item response model to form a 100-point scale. Each student thus has one reading score to represent his or her reading achievement level.

Factor Analyses

Based on the purpose of the present study and an inspection of reading-related questions in the NAEP data set, 47 items from the questionnaires for age 9 were selected. The age 13 and age 17 groups shared the same 58 questions. Due to their relevance for this study, we used approximately two thirds of the questions that the students answered.

At each age level, exploratory principal factor analyses with varimax rotation were performed, using all selected items across categories. Based on these results, a final allocation of items to constructs was developed so that the constructs were as consistent as possible across the three ages (see Table 1). For example, the construct "home literacy" consisted of the same six items for each age;

Table 2. Reliability Indices of Constructs at 3 Age Levels

Construct	Age	# of Variables	Reliability
Home Literacy (HL)	9	6	.58
	13	6	.51
	17	6	.49
Social Interactions (SI)	9	8	.56
	13	8	**
	17	8	.54
Teacher-Directed Instruction (TDI)	9	5	.50
	13	5	.52
	17	5	.60
Student-Centered Instruction (SCI)	13	5	.75
	17	5	.81
Study Strategies (ST)	9	8	.58
	13	8	.69
	17	8	.73
Library Reading (LR)	13	5	.73
	17	5	.74
General Reading Activity (GRA)	9	9	.64
	13	9	.61
News Reading (NR)	13	5	.74
	17	5	.87
Fiction Reading (FR)	17	6	.58
Nonfiction Reading (NR)	17	6	.62

** Input covariance/variance matrix is not positive definite.

the construct of "social interaction" consisted of seven items common to all three ages and one item unique to age 9. Ten constructs were identified: fiction reading, nonfiction reading, news reading, library-involved activities, study strategies, home literacy, social interaction, teacher-directed instruction, student-centered instruction, and oral reading. Fiction and nonfiction reading were combined into general reading at ages 9 and 13. Oral reading was not used in the analyses due to its small number of items.

After the structure was set, confirmatory factor analyses with maximum likelihood

estimation using LISREL were conducted to determine their unidimensionality and to obtain reliability indices, goodness of fit indices, and standardized factor coefficients. Results indicated that reliability indices of constructs ranged from .49 to .87, while goodness of fit indices ranged from .94 to .99, which suggested that the constructs we developed were unidimensional and sufficiently reliable for use in the present study. Table 1 gives the indicators for each construct and their loadings and Table 2 gives the reliability indices for each construct across the three age levels. The relatively modest loadings of the items on the constructs may be attributable to the fact that the sample was heterogeneous with respect to achievement, language, home literacy, and interpretations of the questions, which reduces the variance that is common to the item and construct.

Covariance Matrices

As described in the section on instrumental design, no student answered all questions, even for a single given construct. One way to predict dependent variables using an independent construct is to calculate the factor score on the construct for each subject and then use the resulting scores as an independent variable. However, if this method were used in the present study, all subjects would have had scores only on one or two indicators of a given construct due to the spiralled sampling design. To overcome this limitation of the data set, covariance matrices among the constructs were developed from covariance matrices among the items. The covariance of each item with every other item was computed separately using the data from students who took a given pair of items. For details about the transformations, refer to Guthrie, Schafer, and Wang (1991). The end products after applying the method were covariance matrices among constructs and reading achievement. These were used as input matrices for the path analyses using LISREL.

Path Analyses

The path analyses were exploratory. For each independent construct at each age level, we formulated an initial saturated model with all paths estimated. For example, for 9-year-olds, the constructs of general reading activity, home literacy, teacher-directed instruction, social interaction, and study strategies were included. All constructs were connected with paths leading from the background factor of home literacy to instruction to student characteristics and achievement, and a LISREL analysis was conducted. The rationale for the directions of the specified paths is that we expected instruction to influence the social and cognitive factors jointly, and we expected the social and cognitive factors to influence amount of reading activity. The paths were specified in one direction. Although bidirectional paths could have been used in some cases, they were not used because they could not have accounted for more variance since the goodness of fit indices are extremely high. Although the formal interpretation of relationships is "associationist," the paths were specified and reported in directions that represent likely priority in causal influence.

The procedure for removing nonsignificant paths to obtain a parsimonious model consisted

of: (1) deleting the path with lowest nonsignificant *t* value for the beta for that path; (2) running the LISREL analysis again; (3) examining the chi-square test of goodness of fit; (4) and repeating steps 1 and 2 until the chi-square attained statistical significance at $p < .05$, and then selecting the model that contained the fewest paths for which the chi-square test was nonsignificant.

RESULTS

9-YEAR-OLD STUDENTS

Results will be described in the following order: (a) 9-year-olds, (b) 13-year-olds, and (c) 17-year-olds. The correlations for 9-year-olds are shown in Table 3. The path model of associated variables shown in Figure 1 fit the data extremely well. All of the paths were statistically significant, with $p < .05$. The goodness of fit index was .989; the coefficient of determination was .397; and the chi-square was nonsignificant, X^2 (2, N = 926) = 3.27, $p > .05$. The multiple regression coefficient for reading activity was .49, showing that the variables accounted for 24% of the variance in amount and breadth of reading.

General Reading Activity (Age 9)

Social interaction and amount of reading. The path analysis for age 9 confirmed that social interaction was positively associated with reading activity ($\beta = .34$). Students who talk with their friends and parents about reading and writing are more active readers than students who do not.

In this study, the social interaction of students included the students' relationships with both their peers and their families. One might suppose that student social interaction with family members would be part of the home literacy factor, which is included in Figure 1. However, the factor analysis revealed that questions about student-family interactions around reading entered a "social" construct rather than a "home" construct. This indicates that students perceived that all situations of talking about reading and writing clustered together. The home literacy factor in this study consisted of reading materials in the home and did not include language or social aspects.

Cognitive strategies and amount of reading activity. Breadth of student study strategies was associated with amount of reading at a level that was lower than social interaction and amount of reading, though it was significant ($\beta = .07$). This implies that students who reported high levels of reading activities had a relatively larger number of study and comprehension strategies. Students who possess a variety of approaches to comprehension appear to read broadly. These students may also feel empowered by their competence, and their sense of self-efficacy may lead them to choose to read frequently. The causal relationship probably is not one-directional.

Instruction. At age 9, reading activity was associated with teacher-directed instruction ($\beta = .17$). Students who reported relatively high amounts of reading activity reported that their teachers frequently taught them strategies for comprehending text, learning new words, and studying efficiently. Teachers who emphasize comprehension processes may provide students with strategies that are useful for a variety of

Table 3. Correlations of Reading Activity and Predictor Constructs - Age 9

	HL	SI	TDI	ST	GRA
Home Literacy (HL)	1.00				
Social Interaction (SI)	.09	1.00			
Teacher-Directed Instruction (TDI)	.03	.39	1.00		
Study Strategies (ST)	.06	.33	.49	1.00	
General Reading Activity (GRA)	.12	.44	.34	.28	1.00

reading activities which may extend their amount and breadth of reading. In addition, the teachers' emphasis on comprehension may communicate a value for reading that is adopted and expressed by students through increased reading.

Teacher-directed instruction operated through social interaction to increase reading activity according to the path model at age 9. The β weight of the combined paths (.387 × .341) was .13. Students who were relatively active readers reported relatively high levels of social interaction and they reported relatively high amounts of teacher-directed reading instruction. This path suggests that teachers who emphasized comprehension processes also created an environment which supported students' verbal interactions surrounding literacy. These social exchanges, in turn, seemed to foster the frequency of choosing to read.

Home Literacy. Home literacy levels were associated with amount of reading activity at a relatively low level (β = .08). In this study, home literacy referred to the amount of reading materials, such as books and magazines, found in the home. Although this measure is likely to be correlated with the incomes and education levels of household members and may be a proxy for socioeconomic status, it is reported literally as amount of reading materials at home. Having books and magazines available at home provides opportunities for extending readership from school to family settings, which seems to be supportive of children's reading choices. However, as shown in this path model, the influence of home literacy on amount and breadth of reading is substantially lower than the social, cognitive, and instructional influences.

13-YEAR-OLD STUDENTS

General Reading Activity (Age 13)

For 13-year-olds, the construct of reading activity was divided into general reading and news reading, according to the factor analyses. General reading activity at age 13 was modeled by the constructs in Figure 2. The intercorrelations are shown in Table 4. All of the paths in the model were significant ($p < .05$); the goodness of fit was .997; the coefficient of determination was .37; and the chi-square was nonsignificant, $X^2(6, N = 922) = 10.95$, $p > .05$. The multiple regression coefficient for general reading

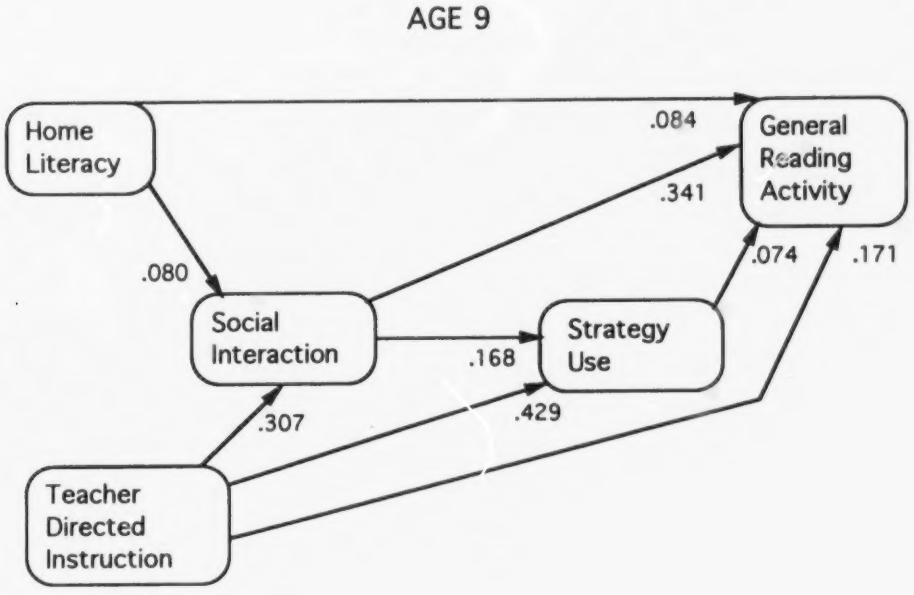

Figure 1. Path Model for General Reading Activity of 9-Year-Olds

activity was .49, indicating that the constructs accounted for 24% of the variance in amount of general reading activity.

Social interaction and amount of reading activity. The amount and breadth of general reading activity was highly associated with amount of social interaction (β = .18). Students at age 13 who reported reading more frequently and broadly also reported sharing their reading and writing relatively often with their friends and family members. Avid readers reported talking, asking questions, and sharing information about reading and books more frequently than students who reported reading less.

Cognitive strategies and amount of reading activity. Students who were more highly involved in a large number of reading activities reported using a relatively high number of cognitive strategies to understand and learn from texts (β = .23). There was an association between amount of general reading and amount of library use (β = .23), suggesting that reading activity was supported by appropriate use of materials and space for reading in the library. Availability of reading materials at home (home literacy) was associated with amount of reading activity at a significant but lower level (β = .10).

Instruction. Reading instruction had a substantial number of indirect associations with general reading activity. Amount of teacher-directed instruction was associated with amount of social interaction (β = .30), number of study strategies (β = .27), and amount of library reading (β = .08), each of which was

Table 4. Correlations of Reading Activity and Predictor Constructs - Age 13

	HL	SI	TDI	SCI	ST	LR	GRA	NR
Home Literacy (HL)	1.00							
Social Interaction (SI)	.12	1.00						
Teacher-Directed Instruction (TDI)	-.02	.36	1.00					
Student-Centered Instruction (SCI)	.02	.28	.50	1.00				
Study Strategies (ST)	.07	.42	.45	.37	1.00			
Library Reading (LR)	-.03	.27	.24	.14	.33	1.00		
General Reading Activity (GRA)	.13	.35	.25	.20	.39	.35	1.00	
News Reading (NR)	.28	.31	.19	.16	.37	.28	.40	1.00

directly associated with amount and breadth of general reading activity. This pattern is very similar to the pattern for 9-year-olds. Students who reported a high level of social interaction around reading and writing frequently reported that their teachers emphasized comprehension strategies, such as using background knowledge, focusing on the main idea, and adjusting their reading speed to text. In addition, the teachers' emphasis on comprehension processes appears to lead students to apply their study strategies to more texts. Finally, frequency of library use may reflect student acquisition of cognitive competence and self-efficacy, both of which enhance amount of reading. We view social interaction, breadth of study strategies, and amount of library use as mediators that connect teacher-directed instruction to the students' amount of reading activity.

Questions about student-centered instruction were contained in the student questionnaires for 13-year-olds, although they were not included for 9-year-olds. Student-centered instruction, which emerged as a construct in the factor analysis, refers to an emphasis on student opinion, debate, and comparison of books. The operational definition consists of the five questions in Table 1. Student-centered instruction was not significantly associated with general reading activity directly, but it was associated with number of study strategies (β = .15) and amount of social interaction (β = .13). Student-centered instruction was significantly associated with teacher-directed instruction (β = .50), showing that teachers who emphasize comprehension processes also emphasize student responses to text and literature to a moderate degree. These two constructs were separate factors, but they were moderately associated.

Student-centered instruction worked in the same way as teacher-directed instruction to

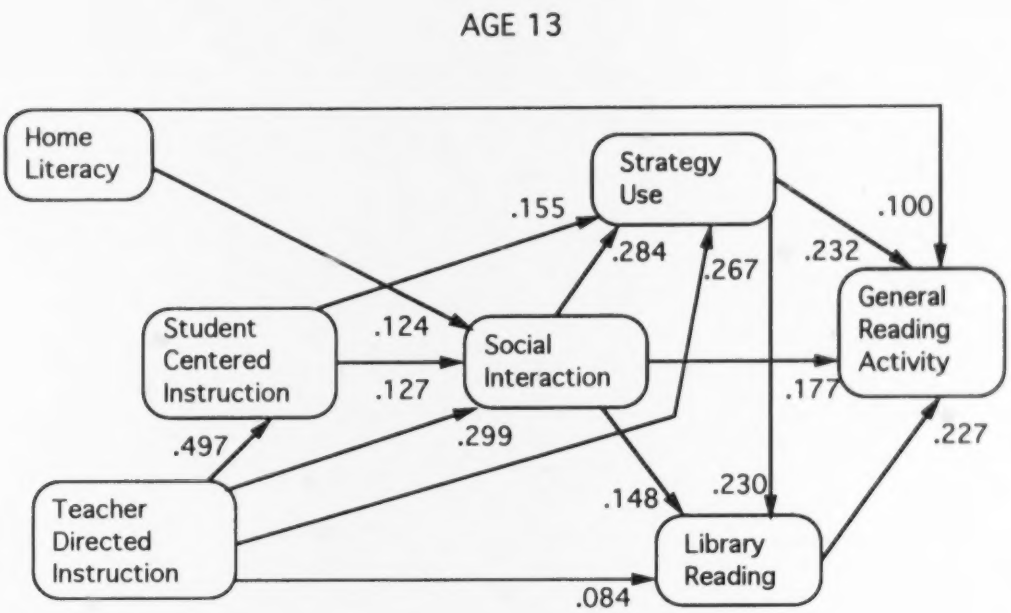

Figure 2. Path Model for General Reading Activity of 13-Year-Olds

influence amount of student reading activity. Both teaching constructs were associated with student social interactions and study strategies, but for 13-year-olds neither teaching construct was directly associated with amount of reading activity. The teacher's emphasis on comprehension had an additional association with amount of library use.

The model in Figure 2 shows that the library played a role in fostering reading activity. Library use was associated with amount of reading at a moderate level (β = .227). It is noteworthy that the constructs of study strategies, social interaction, and teacher-directed instruction all contributed to amount of library reading. Apparently, use of the library permitted the students to use their cognitive strategies, to locate materials for discussion and writing, and to fulfill the expectations of teachers who emphasized comprehension strategies.

News Reading (Age 13)

Among 13-year-olds, reading news was associated with social, cognitive, and instructional constructs in a pattern similar to that of general reading activity for this age group. However, news reading was a separate factor from general reading, showing that students could be avid readers of news, but not avid readers across all topics.

The correlations in Table 4 reveal differences between the predictors of news and general reading consistent with the betas in the path models. On one hand, the association of

Table 5. Correlations of Reading Activity and Predictor Constructs - Age 17

	HL	SI	TDI	SCI	ST	LR	FR	NF	NR
Home Literacy (HL)	1.00								
Social Interaction (SI)	.17	1.00							
Teacher-Directed Instruction (TDI)	.00	.22	1.00						
Student-Centered Instruction (SCI)	.11	.26	.46	1.00					
Study Strategies (ST)	.06	.51	.46	.36	1.00				
Library Reading (LR)	.05	.33	.27	.24	.28	1.00			
Fiction Reading (FR)	.10	.33	.13	.31	.35	.30	1.00		
Non-Fiction Reading (NF)	.21	.29	.17	.13	.33	.22	.37	1.00	
News Reading (NR)	.27	.29	.18	.18	.27	.25	.26	.42	1.00

home literacy and news reading (β = .26) was higher than the association of home literacy and general reading activity (β = .10). This suggests that students often read news at home and that the amount of news-oriented material, such as newspapers and magazines, available in homes influences the amount of news reading activity.

A different trend appeared, on the other hand, for the relationships of social and library factors with news reading. The association of social interaction and news reading (β = .13) was slightly lower than the association of social interaction and general reading activity (β = .18). Likewise, library use and news reading were less highly associated (β = .17) than library use and general reading activity (β = .23). This pattern suggests that students' social interactions and library use were more likely to accelerate their reading of literature and fiction than to accelerate their reading of news. Despite these slight differences, both general reading and news reading activities were deeply embedded in a network of socio-cognitive indicators.

The instructional predictors of news reading activity were weaker than the instructional predictors of general reading activity, as Table 2 shows. However, the pattern of these predictors was similar for news and general reading. Instructional factors were indirectly associated with news reading through social, cognitive, and library constructs. Teacher-directed instruction was associated with social interaction, study strategies, and library reading, all of which were associated with news reading. Student-centered instruc-

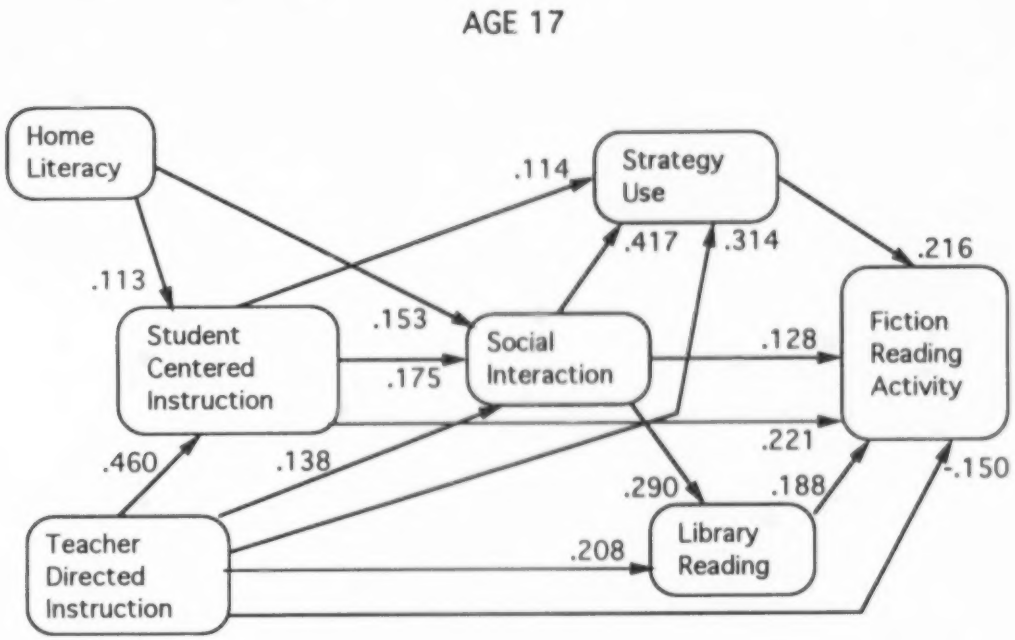

Figure 3. Path Model for Fiction Reading of 17-Year-Olds

tion was associated with social interaction and study strategies, both of which were associated with news reading.

17-YEAR-OLD STUDENTS

Fiction Reading (Age 17)

In the factor analyses for 17-year-olds, the reading activity construct was divided into three sub-constructs: fiction, nonfiction and news. The social and cognitive indicators of fiction reading will be presented first because most reading instruction in high school occurs, if at all, in English classes, which are generally oriented to language, literature, and fiction. The correlations are shown in Table 5. The model shown in Figure 3 fits the data quite well: the goodness of fit was .997; the coefficient of determination was .37; and the chi-square was nonsignificant, $X^2(5, N = 947) = 11.00$, $p > .05$. The multiple regression coefficient was .46, indicating that the model accounted for 21% of the variance in amount of fiction reading activity.

Amount of fiction reading was associated positively with amount of social interaction ($\beta = .13$), number of reported study strategies ($\beta = .22$), and amount of library reading ($\beta = .19$).

The two types of instruction influenced the amount of reading activity in opposite directions. Teacher-directed instruction was negatively associated with amount of fiction reading ($\beta = -.15$), but student-centered instruction was positively associated with amount of fiction reading ($\beta = .22$). This suggests that students who reported reading relatively less fiction received more teacher-

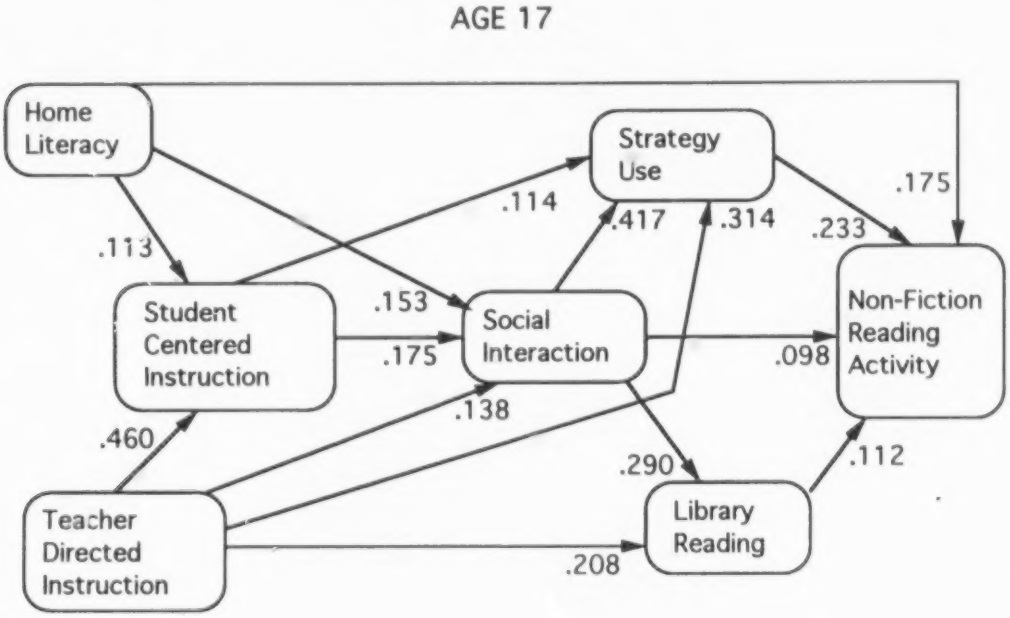

Figure 4. Path Model for Non-Fiction Reading of 17-Year-Olds

directed instruction and less student-centered instruction than students who reported more fiction reading. Both of the instructional variables had significant, positive associations with the students' social interactions and study strategies.

Non-Fiction Reading (Age 17)

The model for nonfiction reading activity was initially specified for statistical testing in the same form as the model for fiction reading. The goodness of fit for the model in Figure 4 was .996; the coefficient of determination was .383; and the chi-square was nonsignificant, X^2 (6, N = 947) = 11.70, $p > .05$. The multiple regression coefficient was .41, indicating that the model accounted for 17% of the variance in nonfiction reading activity. The social-cognitive indicators of nonfiction reading were the same as those for fiction. Nonfiction reading was associated with number of different study strategies (β = .23), amount of social interaction (β = .10), and amount of library reading (β = .11).

The model of nonfiction reading showed one striking contrast to the model for fiction reading. The instructional constructs did not show the same significant direct associations with nonfiction reading that they did with fiction reading. This suggests that teachers did not provide instruction and create social patterns that supported student interest and activity in reading informational books. Teachers seemed to influence the amount and diversity of fiction reading, but not the amount and diversity of expository reading.

Home literacy was associated with nonfiction reading (β = .18), although it was not significantly associated with fiction reading. This may be due to the fact that some of the questions in the nonfiction reading construct pertained to home activities. Although one might suggest that these items were misplaced, we judged that they were valid items for the nonfiction construct for two reasons. First, the items, such as "reading instructions on how to do something," represent not only a student reading activity, but also participation in a milieu where literacy was valued for many useful and informative purposes. Second, according to the factor analysis, it was the students themselves who grouped all the nonfiction activities into a coherent whole.

News Reading (Age 17)

The model for news reading was very similar to the model for nonfiction reading; consequently, we did not present it in a figure. The goodness of fit index for the news reading model was .996; the coefficient of determination was .38; and the chi-square was nonsignificant, $X^2(6, N = 947) = 11.70, p > .05$. The multiple regression coefficient was .41, indicating that the model accounted for 17% of the variance in news reading activity.

Constructs that were positively associated with news reading activity included social interaction (β = .13), study strategies (β = .15), library reading (β = .15), and home literacy (β = .23). The two instructional constructs did not have significant direct associations with amount of news reading activity. The effects of student-centered instruction on library reading varied slightly from the other reading activity models. Student-centered instruction had a significant direct association with library reading (β = .09), although these constructs were not associated in the fiction and nonfiction models. Both social interaction (β = .27) and teacher-directed instruction (β = .17) had lower associations with news reading than they did with fiction and nonfiction reading.

DISCUSSION

A generally accepted goal of schooling is enabling students to become active readers. This goal is deeply grounded in our beliefs about ourselves as individuals in a literate culture (Gee, 1992). Although there are variations in the types of literacy and reading that are valuable in different subcultures in the United States (Reder & Green, 1983), our uses of print are usually important to our beliefs, decisions, group memberships, and self-concepts (Guthrie & Greaney, 1991; Heap, 1991). If schools are to succeed in enabling students to exercise choice in how they participate in the community and the workplace, schools must place a higher priority on nourishing students' reading capabilities and dispositions for choosing to read.

Despite the importance of active reading in the lives of students at school and at home, there are relatively few studies of the instructional conditions within classrooms that foster students' long-term amount and breadth of reading inside and outside of school. Previous studies have shown that the amount and breadth of children's reading activity, measured either by diary methods (Anderson, Wilson, & Fielding, 1988; Taylor, Frye, &

Maruyama, 1990) or by book and author recognition methods (Stanovich & West, 1989) is correlated with reading achievement. However, these studies did not report instructional conditions that support amount and breadth of reading. A few intervention programs including the "book-flood" (Ingham, 1981), certain literature-based language arts programs (Morrow & Weinstein, 1986), and classroom libraries (Guthrie & Greaney, 1991) have been shown to increase students' amount of reading. But none of these investigations examined the social and cognitive mediators of amount of book use. We attempted to expand this knowledge base by asking how instructional, social, cognitive, and home factors work in concert to support students' development as active readers.

We identified indicators of amount of reading for three age groups. For 9-year-olds, reading activity consisted of reading for fun on your own time, reading a book about other times or other places, reading sports or biographies, reading more than one book by a favorite author, and reading magazines, comic books, and newspapers. The reading of 13- and 17-year-old students extended to poems, plays, science, biographies, novels, songs, and reference materials. The students' reports generally referred to voluntary, independent reading rather than reading assigned for homework.

At all three ages (9, 13, and 17), students' reading activities were sparked and sustained by their social interactions with friends and family members. Highly engaged readers said they talked with friends and family members about the things they read. Engaged readers were active writers and they showed their writing to friends and family members. Active readers said they shared the contents and titles of good books with their peers; they also said that family rules about TV watching often led them to read books and magazines at home.

At all three ages, students' reading activities — that is, their reports of reading frequently and broadly — were supported or enabled by a range of strategies for comprehension and learning. Highly active readers reported taking notes, making outlines, re-reading as they studied, questioning themselves, and addressing issues raised by the textbook or by their friends. Being aware of these strategies and using them frequently and appropriately seemed to empower students to locate books that interested them, to comprehend the material that was important to them, to satisfy their curiosity, or to have a rewarding aesthetic experience. Effective use of cognitive strategies enabled students to understand their books, which rewarded their choices and their acts of reading.

At all age levels, classroom instruction fostered students' amount and breadth of reading. Some teachers were more likely than others to help students remember what they knew about a topic before reading, to teach students to find the main idea in a paragraph, to encourage vocabulary development, and to provide questions as guides for comprehension. This instruction was valuable, but its influence was not direct. Teachers who provided comprehension instruction also provided occasions for students to talk to each other. These teachers enabled students to develop interests they could share with their friends and family members. Social interactions, then, were supported by the teacher and appeared to

nurture reading. Instruction in reading was not likely to increase amount and breadth of reading unless the teacher also provided for the development of interpersonal relationships that laid the foundation for sharing books and experiences derived from reading books. These findings provide quantitative confirmation of the sociolinguistic perspective on reading, which emphasizes that social contexts influence the materials, purposes, settings, conversations, and thinking that surround reading (Bloome & Green, 1992; Gee, 1992; Green & Weade, 1987; Harste & Woodward, 1989).

Teachers who emphasized reading instruction as described in the previous paragraph also helped students learn and use a variety of cognitive strategies, including note-taking, outlining, self-questioning, and using background knowledge. Students who used these approaches reported that they read more widely and frequently than students who reported using a narrower range of cognitive strategies. Note that instruction in comprehension did not increase amount of reading in a simple way. Instruction did not increase amount of reading unless it enabled students to be aware of reading strategies and to use them for understanding what they read. In other words, the influence of instruction on amount of reading was mediated by the students' awareness and use of cognitive strategies, as well as their social interactions surrounding reading. These findings support the expectations from previous research by Deci et al. (1991) and Borkowski et al. (1991), which suggested that possessing and being aware of cognitive strategies will foster the use of strategies for learning and enjoyment through reading.

The trends noted in the previous three paragraphs all occurred for all age groups. More elaborate relationships between instruction and amount of reading appeared among older students. For the 13- and 17-year-olds, student-centered instruction increased amount of reading indirectly. Teachers who emphasized students' opinions, comparisons, and diverse interpretations fostered more reading activity than teachers who gave few opportunities for student self-expression. It is interesting that teacher-directed instruction and student-centered instruction were correlated. Teachers who emphasized one type of instruction also emphasized the other type. For the two older student groups, use of the library also contributed to their reading activities. More active readers used the library to find books, to complete their school work, and to share reading with peers.

One unique contribution of this study is the finding that the students' use of cognitive strategies and their social interaction patterns simultaneously influenced their amount and breadth of reading. Neither cognitive strategy instruction nor student participation in social interactions was sufficient. The teacher as instructional leader fostered learning on both cognitive and social fronts. Teachers who built a relatively strong classroom framework that simultaneously supported cognitive strategy learning, social discourse around reading, and motivational development, fostered students' amount and breadth of reading significantly more than teachers who did not provide as strong and broad a framework.

These findings extend what we know about how instruction influences reading in several ways. Studies of sociolinguistics described in the introduction (Bloome & Green, 1992) show

that the social milieu shapes how students understand literary works. The present findings verify that an instructional framework that jointly supports social interchange around the meanings of books and conveys useful cognitive strategies for understanding text will foster the amount and breadth of reading. This study extends our understanding by confirming the instructional research of Morrow (1992) and others which shows that social discourse fosters the frequency and breadth of students' reading choices. Social context effects are not restricted to a few selected situations, but these social influences are occurring nationwide. Teachers have been orchestrating them at least since the time these data were collected in 1986.

The study extends our understanding of the role of cognitive strategies as well as social context in reading development. Not only does strategy instruction improve comprehension of text (Duffy et al., 1987), but this study strongly implies that strategy instruction increases amount and breadth of reading activity. Previous studies that have claimed to show the benefit of strategy instruction for amount and breadth of reading have been based on teachers' self-reports. For example, Pressley and others (Pressley et al., 1992) wrote that teachers who were highly experienced in strategy instruction felt that learning strategies helped students to be more avid readers. These findings expand the data base by adding student self-report from a wide variety of classrooms.

To arrive at our interpretation of the factors that influenced amount of reading activity, we made several assumptions. We assumed that the teachers actually taught, behaved, and believed in ways that were consistent with students' accounts of instruction. This assumption is consistent with the findings of Taylor, Frye, and Maruyama (1990). When a student reported that a teacher "tells how to find the main idea of a paragraph," we assumed that the teacher actually performed this act more often, or more emphatically, than a teacher for whom a similar report was not given. In other words, we assumed that the student reports had sufficient accuracy to permit valid relationships to appear. Although independent observations of teachers may reveal more frequent or more complex instruction than students reported, we believe the student report data were unlikely to be biased in such a way as to yield incorrect patterns of association. The assumption that student reports were accurate was substantiated by two of the study's findings. First, in terms of the influence of teacher-directed instruction on reading, the results were highly similar at ages 9 and 13. This replication across age and grade levels militates against a simple artifactual effect due to confounding of student report of direct instruction with teacher use of certain materials or specific teacher traits such as amount of organization. Second, the replication reduces the likelihood that the effect is due to chance and/or correlated measurement errors in the data.

The measurement procedure used in the NAEP questionnaires, on which these data were based, was self-reporting by students. A note of caution is warranted regarding these self-reports. If students lack awareness of instruction, their reports may be inaccurate; if students lack knowledge, memory, or motivation, their reports may be capricious.

We have no reason to believe, however, that student reports of these variables were systematically biased in one particular direction. These reports may lead us to underestimate, but they are not likely to lead us to overestimate, the relationships described in this paper.

The construct of social interaction was based on student reports. The data referred to student interactions with peers and family members. Students with high ratings on this construct reported that they frequently "talk with their friends about something they read." Of course, students may talk in the classroom, hallway, or school library, or on the telephone; the places, times, and topics of this "talk" were not specified in the questionnaire. Although these conversations may have occurred in many situations, we assumed that the student discussions were requested, stimulated, encouraged, or otherwise nurtured by the teacher. The association between teacher-directed instruction and social interaction suggests that teachers who were directive in their instruction also initiated discussions and created opportunities for exchange about the topics of students' reading.

A necessary assumption in any study is that most of the important factors have been identified. One unidentified factor in this study was motivation. There were no questions that related to students' desire to read or their interest in reading. We expect that the direct effect of teacher-directed instruction on amount of reading activity is attributable partly to motivation. Teachers who emphasize the importance of comprehending and learning from books probably create interest in books and foster students' motivation to read. Although adding motivation to the variables used in this study may enable us to account more fully for amount of reading activity, we do not expect that adding motivation would change the pattern of relationships that we observed.

Measurement of amount and breadth of reading is problematic. First, self-reports and answers to questionnaires may be subject to social desirability effects. Although this effect may inflate the absolute levels of reading, however, it should not bias relationships in a correlational study (Stanovich & Cunningham, 1991). Second, it is possible that lower achievers may be more likely than higher achievers to overestimate their reading, but the effect of this would be to shrink the variance and reduce correlations, producing conservative estimates of relationships. Third, measures of reading activity such as book title recognition and author recognition are not highly subject to social desirability effects, and they correlate with vocabulary and general information both in elementary and college students (Cunningham & Stanovich, 1991). These measures, however, have not been developed to represent the print exposure of national samples that include minority groups, and they may not be equitable for non-English speakers. We conclude that although self-report of amount of reading is necessarily subject to errors of measurement, it yields an unbiased and conservative association with educational processes across a range of economic and ethnic groups.

A widely used method for studying the effects of social factors on learning is intensive

qualitative observation. In-depth studies of classrooms (Alvermann, O'Brien, & Dillon, 1990; Green & Weade, 1987) and other learning situations (Rogoff, 1990) can reveal the sequences and patterns of interaction surrounding reading. Intensive observation of one classroom or one teacher, however, does not easily capture the frequency of an event such as reading, across situations such as classrooms, hallways, libraries, homes, or recreation centers. To sample situations broadly, it becomes necessary to ask questions face-to-face or on paper. The questionnaire also gathers detailed information across a representative number of persons, in this case a national sample.

This study provides evidence that multiple educational constructs are simultaneously related to students' amount and breadth of reading. A detailed portrayal of students as active readers and a more fully elaborated description of teachers' roles, student participation patterns, social learning, and the intellectual consequences of social interaction in a reading environment are needed. A few authors have begun research in this direction (Bloome & Green, 1992; Hiebert & Fischer, 1990; Morrow & Weinstein, 1986; O'Flahavan, 1990). Continuation of this line of inquiry seems warranted. Qualitative as well as quantitative research is needed to describe motivational patterns, sources of books, teachers' roles, students' responsibilities, and perhaps parental involvement in the school that mediate the effects of instructional influences on amount and breadth of reading activity. These issues should be studied at all levels because, in addition to fundamental similarities observed throughout the schooling process, there were differences between age groups that warrant further inquiry.

Author Notes. The numbers on the path models shown in Figures 1-4 are beta weights, which indicate the strength of the "path," with other variables controlled.

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